DOCUMENT RESUME

ED 277 633 SO 017 835

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TITLE The Media, Elite Conflict, and Risk Perception in Nuclear Energy Policy.
PUB DATE Aug 86
NOTE 41p.; Paper presented at the Annual Meeting of the American Political Science Association (Washington, DC, August 28-31, 1986).
PUB TYPE Speeches/Conference Papers (150) -- Viewpoints (120)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Dissent; *Ecology; Higher Education; Journalism; Public Policy; *Science and Society; Social Action; *Social Attitudes
IDENTIFIERS *Nuclear Industry

ABSTRACT

The argument undergirding this essay is that the new environmental movement in the United States is partly a symbolic issue. Some liberal or radical members of key strategic elites who are alienated from the social and political system are drawn to concrete issues which serve as a surrogate for a real criticism of the hegemonic structure. The question of nuclear energy was chosen to test this argument. Five predictions were made, then confirmed by the evidence: (1) the relevant scientific community would be highly supportive of nuclear energy; (2) views about nuclear energy would correlate highly with political ideology among various non-scientific leadership groups; (3) national media journalists would be skeptical of nuclear energy; (4) journalists would inaccurately perceive and report the views of the relevant scientific community on nuclear issues to other elites and to the general public; and (5) the views of key leadership groups would correlate highly with the news sources which they perceive as reliable. In conclusion, the fears of United States citizens about new technologies and nuclear energy in particular have emerged because of real problems which deserve careful discussion, thought, and decisions. However, the exaggerated concerns about the possible risks of nuclear power are due to conflict among various leadership groups, a weakening of the social fabric of the society, a social mistrust that dates from the early 1960s, and a shift of the locus in influence and power in our society. (Author/BZ).

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The Media, Elite Conflict, and Risk Perception in Nuclear Energy Policy

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Prepared for delivery at the 1986 Annual Meeting of The American Political Science Association, The Washington Hilton, August 28-31, 1986. Copyright by the American Political Science Association.

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This essay is part of a larger study of social and political leadership in the United States of which Stanley Rothman is the Director and S. Robert Lichter is the Associate Director. It is sponsored by The Center for the Study of Social Change at Smith College, The Center for Media and Public Affairs, The Research Institute on International Change at Columbia University, and George Washington University.

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ABSTRACT

Changing American attitudes toward new technologies are examined as are explanations of such changes. We hypothesize that increased concern with the risks of new technologies by certain elite groups is partly a surrogate for underlying ideological criticisms of American society. The question of risk is examined within the framework of the debate over nuclear energy. Studies of various leadership groups are used to demonstrate the ideological component of risk assessment. Studies of scientists' and journalists' attitudes, media coverage of nuclear energy, and public perception of scientists' views suggest both that journalists' ideologies influence their coverage of nuclear energy, and that media coverage of the issue is partly responsible for public misperceptions of the views of scientists. The paper concludes with a discussion of the historical development of the environmental movement in the 1960s and 1970s and the relation of this movement to to the public's declining support for nuclear energy.

Introduction

Public attitudes toward the environment and the risks and benefits of technological progress have undergone a dramatic change in the United States during the past twenty years.

Today most Americans appear to be convinced that wide ranging laws, protecting them against risks and environmental degradation, are absolutely necessary. A significant portion of the population contends they are willing to accept a drop in their standard of living (though they do not believe this will occur) to reduce pollution or other environmental hazards (Public Opinion, 1982, p. 35).

The shift in public attitudes has been accompanied by a shift in the structure of power. Twenty five years ago most decisions having to do with new technologies were made by the private sector, or by the president, a few congressmen and some bureaucrats, in consultation with the relevant industries and a small elite group of scientists. Today the credibility, authority and freedom of business is much smaller. Increased public interest group activity and media attention have been accompanied by expanded bureaucratic controls, much broader legislative involvement, and significant judicial intervention.

The scientific establishment is far less influential than it once was, and scientists employed by industry have less credibility than Ralph Nader, or scientists who are members of "public interest" groups. A 1982 national survey of public attitudes toward the electric utility industry (Unpublished Cambridge Reports Inc. study, January, 1982), reveals that only 12 percent of the population regard the testimony of a "consortium of public utilities" on energy matters as "very believable," and only

eight percent give that rating to the nuclear industry. On the other hand 37 percent regard the testimony of "a scientist at a leading university" as very believable; Ralph Nader is voted very believable by 24 percent of the public; and "your favorite television commentator" is highly trusted by 17 percent of the sample.

For this reason, in part, various "public interest" groups now have considerable clout. Indeed, despite the efforts of the Reagan administration to loosen regulatory controls, such groups have won at least as many battles as they have lost.

What explains these shifts in public attitudes and in the structure of political power? The extant literature offers three broad answers to that question.

First, several scholars have argued that the shifts are partly the result of economic and technical change itself (Eisenbud, 1978; Brooks, 1979; Aharoni, 1981; Perrow, 1984). Technological change has considerably accelerated since World War II. We now have the capacity to injure much larger populations much more easily than ever before in human history, either intentionally or inadvertently.

Of course, although potential dangers are greater, we are still becoming more affluent and healthier (Wildavsky, 1980). Paradoxically, such progress has reduced citizens' willingness to accept risks. Our expectations have grown. In addition, scientific advances have enabled us to detect smaller and smaller traces of possibly toxic substances in our environment and to measure ever smaller effects of such substances on populations. Thus, once even minute traces of possibly toxic substances are found, the national media highlight the discovery, and administrative agencies move to regulate.

Second, critics of American business practices argue that the anxieties of ordinary Americans about the environment and certain technologies are rational responses to real dangers. Ralph Nader, and his followers, the staffs of some environmental groups, and other activist scientists such as Barry Commoner, believe that through carelessness or self interest, if not actual malice, American business is dangerously polluting the environment with everything from nuclear energy to food additives (Commoner, 1971; Nader and Abbots, 1977; Efron, 1984; Epstein, 1979).

Radical critics insist that many scientists and engineers exploit new technologies without considering consequences or seek to solve social problems by technological fixes. They level the same charge against conservative businessmen.

Third, some theorists deny that the development of technology is as threatening as critics imply. They maintain that other motives are involved in attacks upon the supposed dangers of technological change. Aaron Wildavsky and Mary Douglas (1982), for example, see "extreme" environmentalism as part of a new cult, produced by the erosion of traditional American values. They regard environmental issue as a surrogate for a broader attack on those values.

All the positions outlined above contain some truth. The argument from technical change has much to recommend it. The United States and other industrial countries are faced with real and serious problems. In addition businessmen with financial and emotional commitments to new technologies find it very difficult to accept evidence of negative effects until such evidence becomes irrefutable. Of course, socialist

managers exhibit the same reaction, which is why socialist nations have similar problems in dealing with environmental and public health issues.

However, our own study of American social, economic and political leaders Douglas and Wildavsky are correct in arguing that ideological factors have also played an insufficiently recognized role in Americans' changing perception of risk.

Our argument consists of six interrelated hypotheses: (1) The relevant scientific community is highly supportive of nuclear energy. Neither ideology nor economic self interest play a substantial role in such support. (2) Among other key leadership groups, views about nuclear energy correlate highly with political ideology. (3) National media journalists are skeptical of nuclear energy. (4) Journalists inaccurately perceive and report the views of the relevant scientific community to other elites and to the general public. (5) The views of key elite groups on nuclear energy correlate highly with the news sources which they consider reliable.

These hypotheses are derived from a broadly speculative historical view of the growth of the environmental movement in the United States, and its relation to changes in American society.

We shall deal with these hypotheses more or less seriatum in the next two sections of the paper, comparing them to alternative non ideological hypotheses.[1] We will develop our historical analysis in the third section. We concentrate on nuclear energy because our research has generated sufficient data on this topic. However, we suspect that the same factors ~~are~~ operate in other areas. (Snyderman and Rothman, 1986*).

I. Nuclear Energy, Ideology and The Perception of Risk

In the 1950s the vast majority of Americans supported the development

of nuclear energy (Public Opinion, 1979, p. 23). Today a substantial majority opposes the building of new nuclear plants. Moreover opposition is strongest among the most articulate and politically active segments of the population. Cost overruns and the abandonment of many partially completed nuclear facilities in the United States have probably played a role in the development of negative attitudes among various leadership groups. Nevertheless, for the average person, fears about the safety are far more important. (Inglehart, 1984). The meltdown at Chernobyl in the Soviet Union has accentuated such fears to the point where nuclear development is not, at this time, a viable energy option in the United States.

The view that nuclear plants are unsafe is shared by a significant number of Americans in positions of social influence or responsibility. For the past several years we have been surveying various leadership groups in the United States, including national media journalists, managers in major corporations, military and religious leaders, partners in top corporate law firms, federal judges, creators of television and motion picture entertainment, trade union leaders, high level government bureaucrats, and public interest group leaders. The journalists and business leaders were surveyed in 1980. The remaining groups were sampled after 1982. The overall sample size for this analysis is 1259 individuals. The samples were drawn randomly from each targeted group (Appendix A)

Respondents rated the safety of nuclear plants on a seven point scale ranging from (1) very unsafe to (7) very safe. We characterized scores of five or higher as exhibiting relative confidence in the safety

of nuclear plants. The results indicate considerable variation among the groups sampled. Thirty seven percent of the journalists interviewed consider nuclear plants to be safe, as do only 13 percent of the television entertainment elite, 14 percent of the motion picture elite, and six percent of public interest group leaders. By contrast, 49 percent of the corporate lawyers believe nuclear plants are safe as do 52 percent of top level federal bureaucrats and 86 percent of military leaders.

Table One about here

How do these diverse estimates of nuclear safety accord with the scientific community's own evaluations? To find out we sampled, in 1980, 1000 scientists drawn randomly from American Men and Women of Science, supplemented by another sample of 300 scientists who work in energy related fields. We defined the latter group broadly, including persons in fields such as atmospheric chemistry, solar energy, conservation and ecology. In all we included 71 disciplines in our energy expert sub-sample. In our smaller nuclear energy expert sample, we included experts working in such nuclear related fields as radiological health and radiation genetics as well as nuclear engineers and physicists. Seventy four percent of the scientists sampled returned usable questionnaires.

Scientists, especially those in energy related fields, regard nuclear energy as a necessary and relatively benign source of energy. Ninety percent of the random sample, and 95 percent of the energy expert sample believe that we should proceed with the development of nuclear energy. Seventy six percent of the energy expert sample and 99 percent of the nuclear energy expert sample, believe nuclear plants to be safe. (For

a full list of the results and the fields included in the energy subsamle see Rothman and Lichter, 1982 and Lichter and Rothman, 1983).

At least some critics of those scientists who support nuclear energy (Nader and Abbots, 1977) have argued that the views of the energy expert community are strongly influenced by political conservatism or economic self-interest. To test this hypothesis a multiple regression analysis was performed on the energy expert sample to predict scientists' attitudes toward nuclear power. We entered the following variables: employment status (business, government, pure academic or consulting academic), region of residence, religious background, and self described political beliefs. As table two demonstrates, the regression accounts for only 11.6 % of the total variance in safety estimates, with ideology explaining only 4.4%. None of the other variables explains more than one percent of the variance in safety estimates, and scientists show no statistically significant differences in their attitudes according to their type of employment. In short, scientific experts are mostly sanguine about nuclear safety, and economic self interest plays no role in their assessments. Ideology is a statistically significant predictor but the proportion of variance it explains is, as we shall see, very small a compared to that of non science leadership groups.

Table 2 about here

We administered a short form of the survey to the same respondents in 1985 with almost exactly the same results. A second replication of our study in Germany last year reveals that German scientists agree with their American counterparts (Institut fur Demoskopie, 1985). Engineers in energy related fields are even more supportive of nuclear energy than are

scientists (Lichter, Rothman, Rycroft and Lichter, 1986)

Our findings of discrepancies between expert and public attitudes are not unusual. Slovic and others have discovered that the public's perception of danger does not correspond to the judgements of experts or to actuarial tables (Slovic, Fischhoff and Lichtenstein, 1979; Upton, 1982). Most significantly, they found that nuclear energy was rated as far more dangerous than any realistic assessment would indicate. They hypothesize that the public is more concerned with possible major disasters, than with more familiar every day causes of injury or death. No matter how remote the possibility of their occurrence, such disasters are perceived as far more likely to be highly disruptive, both socially and psychologically. The public can accept with equanimity that the number of deaths resulting from the burning of coal will be much greater than those which might accrue from the building of new nuclear plants, because the former can be taken in stride (See also Perrow, 1984).1/

This hypothesis is not born out by the evidence. As Wilson and Crouch (1982) and others have pointed out (Aharoni, 1981) people tend to ignore improbable highly destructive disasters and live their lives as if these would not occur. The probability of a large meteor striking a major city is no less than that of a worst case nuclear meltdown, as are the probabilities of a major earthquake in California, a massive flood disaster in other parts of the country or the collapse of a major dam. Yet people not only live with these possibilities, they even ignore them e.g., failing, to take out flood insurance.

How does one explain the wide differences in safety estimates among the various non-scientific leadership groups we have studied? Our second

hypothesis states that, in contrast to the scientific community, social and political ideology plays a major role. To measure ideology, a factor analysis was performed on responses to social and political attitude questions. Respondents were asked to register scale agreement or disagreement with a series of statements of the form, "The American legal system favors the wealthy." A principal components analysis with varimax rotation identified the two factors shown in table three. They were interpreted to represent socio-economic liberalism and alienation from political institutions (See Appendix A.)2/ We then regressed safety attitudes onto the liberalism and alienation variables represented by the factor scores. The result appears in column one of table three. Ideology explains 41.2% of the variance in estimates of nuclear plant safety. The contribution of liberalism is almost twice that of alienation, but both are significant at .001.

Table three about here

These ideological dispositions are not mere expressions of differences in social background, as columns two and three illustrate. When a set of demographic variables representing age, sex, religion and geographic region of origin are added to the equation, the change in r^2 is only .001, a statistically insignificant increment.

When the order of entry is reversed, social background alone accounts for 17 percent of the variation in safety ratings, with age, gender and religion making significant ($p? <= .01$) contributions. Safety ratings are positively associated with increasing age, male gender, and non-Jewish religious affiliation. When the ideology variables are added, however, they not only increase the variation explained by 25 percent but also account

for most of the variation previously attributed to age and religion. In the combined equation only alienation and liberalism make significant contributions at the .01 level, with gender also significant at .05. Thus ideology clearly retains more predictive power than social background.

The independent influence of group membership on safety ratings is more difficult to assess, as the equations in table four indicate. Owing to multicollinearity, we cannot exclude the possibility that the explanatory power of ideology overlaps with that of membership in one or another elite group. Dummy variables representing group membership significantly increase the variance explained in nuclear safety assessments over the ideological variables alone, with r^2 rising from .412 to .479, an increment statistically significant at .001. In the equation shown in column four, both ideological variables retain predictive power, but membership in the public interest and Hollywoood (television and cinema) elite samples also independently reduce confidence in nuclear safety, while membership in the military and bureaucrat groups increase safety estimates. When the stepwise sequence is reversed, in column five, group membership alone accounts for 35 percent of the variance in safety attitudes, and ideology then provides a statistically significant increment of 13 percent. Comparing these results suggests that ideology is the more important predictor, since it explains more of the variance than group membership, both as the first and second entrant into the equation. Moreover, if either variable is primarily a surrogate for the other, the socialization and opinion-formation literature suggest that ideology would take preference over adult membership in an elite group. That is, broad sociopolitical orientations among highly educated and

occupationally successful individuals tend to be formed early and to exhibit relative stability (Lichter, Lichter and Rothman 1982; Ladd and Lipset, 1976, pp. 74-81; Mazur, 1986).3/

Further, with some exceptions, it is difficult to derive a consistently logical relationship between these occupational groups and attitudes toward risk. It might be argued that some groups (e.g. the military) are simply more willing to take risks than others (e.g motion picture directors and producers). Yet that would not explain the assessments of many groups. For example, government bureaucrats and lawyers in large bureaucratic firms are not noted for their attraction to risk. Yet both groups are rather positive toward nuclear energy development.

Concern about safety is the major determinant of support levels for nuclear energy development among members of leadership groups. Such concern explains about 46 percent of the variance in support for nuclear energy among the groups we studied.

Finally, is no evidence that liberals or radicals are by instinct more risk aversive than are conservatives. During the fluoridation controversy of the 1950s, conservatives were far more concerned about risks than were liberals. They used many of the same arguments about uncertainty and possible danger that have been used more recently by opponents of nuclear energy (Mazur, 1981). Today the French Communists are strong supporters of nuclear energy. As one Communist deputy put it, in dealing with the controversies over nuclear energy: "The enemy of the workers is not nuclear power and science, but capitalists and management" (Golay, 1980).

In short the key variable explaining support for, or opposition to, nuclear energy for the groups we studied is safety. But concerns about

safety correlate highly with scales of political ideology. Our data, then, provides a prima facie case for our second hypothesis. Attitudes toward nuclear energy in key leadership groups are related to broad social and political perspectives. We turn now to our third hypothesis, namely that some of these groups have persuaded significant segments of the public to share their skepticism concerning nuclear safety.

II. Nuclear Energy: Scientists vs The Media

As we have already seen, the scientific community is highly supportive of nuclear energy, which they regard as a relatively benign energy source which should be tapped, and the views of independent scientists on environmental issues are held in relatively high esteem by the population at large. One would, therefore, expect the public and various leadership groups to follow the lead of the scientific community on this issue. In fact the public is relatively unaware of the views of the scientific community. In a 1984 national poll, almost six out of ten respondents expressed the belief that those scientists who are energy experts are evenly split as to the safety of nuclear energy, or consider nuclear energy unsafe (Unpublished Cambridge Reports Inc. study, February, 1984).

The general public is not alone in these views. Most of the elite groups in our sample seriously underestimate scientific support for nuclear energy. For example 85 percent of television producers, writers and directors believe that 60% or fewer of those scientists who are energy experts support the further development of nuclear energy. Indeed, like the general public, most of the leadership groups we studied perceive energy experts as sharply divided on the issue of nuclear

energy. And this belief is associated with their views of nuclear safety. We found a negative correlation of .36 between estimates of the opposition of scientists to nuclear energy and the belief that nuclear plants are safe.

Why should the general public and the leadership groups we studied be so misinformed on this question?

Part of the reason for erroneous public perceptions of the views of the scientific community on nuclear energy lies with the manner in which information about those views is communicated to the public by scientists themselves. The scientific community as a whole does not communicate with the general public. Rather a somewhat smaller group of more visible scientists does most of such communicating (Goodell, 1977), and this group seems skewed toward the anti-nuclear argument.

Our survey asked scientists both how many articles they had published in professional peer reviewed journals and how many articles they had published on science policy questions for the more general public. We also asked whether scientists should restrict public statements on science policy matters to their areas of expertise, and whether research findings should be accepted by professional journals before they are released to the popular press. We then compared the responses of the most antinuclear and pronuclear scientists with those of the entire sample.

The results suggest that antinuclear scientists reject traditional norms of scientific communication. Twenty five percent of all scientists strongly agree that scientists should restrict public statements on science policy matters to areas of their expertise, compared to only eight percent of the most antinuclear scientists. Forty seven percent of the general

scientific community agree that research findings should be accepted by professional journals before they are reported in the popular press, while only 17 percent of the antinuclear scientists agree. The responses of pronuclear scientists, by contrast, are almost exactly the same as those for the entire sample.

The publication records of the scientific community reflect these beliefs. Fifty seven percent of our entire sample, and 59 percent of our pronuclear sample had published more than ten articles in academic or professional journals, compared to only 41 percent of the very antinuclear scientists. On the other hand, while only 11 percent of all scientists and 13 percent of highly pronuclear scientists have published articles on science policy in popular journals, the figure for antinuclear scientists is 36 percent.

Tables 4 and 5 about here

More significantly, only one out of ten scientists who has published professionally on nuclear energy believes that the possibility of an accidental release of radioactivity from reactors is a very serious problem. On the other hand, four of the ten who have published on nuclear energy only in popular journals hold this view. Only 15 percent of those who have published professionally believe that there are serious problems with the safety systems of nuclear plants, compared with seven of ten who write only for the general public. Lastly, more than nine out of ten of those who have published professionally are reasonably or very sure that we now possess the knowledge to solve the problems of nuclear energy, as against only six of the ten who have written about nuclear energy only, in

nonprofessional journals. All these differences are statistically significant.

The publicly oriented group is small. One hundred and twenty scientists in our sample have published on nuclear energy. Of these only ten have written solely for popular journals. However, this suggests that between 1,000 and 2,000 scientists listed in AMWS had written articles on nuclear energy for the general public, without ever submitting their ideas to review by professional peers.

The relative skepticism of scientists who write only in popular journals may help explain why the public has a distorted view of the attitudes of the scientific community. However, this cannot be the full story. Given the absolute numbers, many more pro-nuclear than antinuclear scientists have published articles in popular journals. It is possible that antinuclear scientists publish in larger circulation periodicals, but our data points to another factor.

Elite journalists, including leading science journalists, are skeptical of nuclear energy. The most skeptical journalists of all are television commentators. On a "nuclear support" scale, constructed from several survey items whose scores from minus nine to plus nine, scientists in energy related fields score 5.10, while television reporters and commentators score minus 1.89. Journalists employed by the national media are politically liberal, and, as with other groups, their political ideology correlates with skepticism about the safety of nuclear energy. Most importantly, these attitudes seem to be reflected in news coverage.

Table 5 About Here

Our content analysis of nuclear energy coverage by the national media demonstrates that a distinct anti-nuclear tilt started in the early 1970's on television and the late 1970's in print. Overall, the major newspapers, magazines and television networks we analyzed failed to accurately report the views of the scientific community. Antinuclear stories outnumbered pronuclear stories by two to one on television and in news magazines. Among nuclear experts cited in news stories critics outnumbered supporters by over two to one at news magazines and five to one on television. (Lichter, Rothman and Lichter, 1986)

$$ Additional evidence is available from other sources. The Media Institute found that antinuclear experts and groups appeared on prime time TV newscasts during the 1970s about twice as often as pronuclear sources (The Media Institute, 1979). By far the most widely quoted "independent expert" source on nuclear energy on television newscasts during the period of the study was the Union of Concerned Scientists (UCS).The UCS has been very critical of nuclear energy.4/

The individual "expert" who received the most television exposure during the period of the Media Institute study was Ralph Nader, and the only academic scientific expert quoted in the aftermath of Three Mile Island was Dr. Ernest Sternglass, a strongly antinuclear radiologist. Neither in the eleven year period before Three Mile Island, nor during the month after, were pronuclear outside experts among the ten top quoted sources. The only pronuclear sources in the top ten were spokesmen for utility companies and the nuclear industry. As we have seen the public credibility of such organizations is quite low.

$ As our data indicate, many independent pronuclear scientists are

available. Some of them, like Hans Bethe, are both well known and active in their support of nuclear energy. The views of such people would have been far more representative of the scientific community than those of Dr. Sternglass.

Physicist Bernard Cohen recently conducted a poll of academics in the radiation health field. He found that 91 percent believe that public fears of radiation are excessive, and about the same proportion believe that television and the press exaggerate these dangers. When asked to evaluate the scientific credibility of 19 scientists who write or speak about radiation, these experts gave Dr. Sternglass their lowest rating (14, on a scale ranging from 1 to 100) (Cohen, 1983, pp. 258-262).

It is conceivable that antinuclear scientists are more likely to seek out the media than are pronuclear scientists. However, we found that pro nuclear scientists are no more likely to refuse to be interviewed by journalists than are their antinuclear counterparts. It seems equally likely, therefore, that journalists tend to seek out antinuclear scientists. Indeed, the elite journalists we surveyed were asked to list information sources they considered reliable on nuclear energy. They selected more antinuclear than pronuclear sources by a margin of over six to four (Lichter, Rothman and Lichter, 1986).

To be sure, as Combs and Slovic have demonstrated (1978), the media give far more play to "unusual disasters" (such as collapsing dams, tornados or railroad accidents) than to daily occurrences which may kill or injure far more people. In addition, however, journalists are probably no different from anyone else in one respect. They seek out sources they trust to help them understand issues which are both controversial and highly technical. And people tend to trust "experts"

who share their own social outlooks.

During the 1950s fluoridation controversy, the leading national media deferred to the views of the scientific establishment in ways that they no longer do. Certainly, reporters then were just as interested in disaster as they are now, and the science staffs of television or newspapers were neither larger nor better trained than they are today. Today, however, journalists regard "antiestablishment" scientists as rather more trustworthy than mainstream scientists (Goodfield, 1981).

It is hard to know to what extent media coverage actually influences the views of the larger public. In the recent past most academic commentators have suggested that this influence is minimal. However, more recently, scholars such as Elizabeth Noelle-Neumann (1973) in Germany, and Michael Robinson (1976) and Benjamin Page (Page, Shapiro and Dempsey, 1984) in the United States (among others), have begun to build an impressive case on the other side.

It is not unreasonable to ascribe erroneous elite and popular perceptions of scientists' nuclear energy views at least partly to media coverage, and other evidence adds to the plausibility of this conjecture.

We asked a number of our elite groups to rate the reliability of six national media outlets (e.g.,The New York Times, the television networks, and Time, and six journals of opinion,(e.g.,The National Review, The Nation, The New Republic, etcetera). We found a positive correlation ($r=.38$, $p<.001$) between believing that The National Review is a highly reliable publication, and the belief that nuclear plants are safe. The National Review is a conservative journal which strongly supports the development of nuclear energy. On the other hand we found a negative correlation of

(r=.19, p<.001) between the belief that public television is highly reliable and the belief that nuclear plants are safe. Public television commentators were the most liberal and antinuclear group of reporters in our sample, scoring -3.25 on the nuclear support scale. Overall, the reliability accorded to various media outlets explained 31 percent of the variation in estimates of nuclear safety.

Thus, the data lend at least some support to our third, fourth and fifth hypotheses. It does seem as if journalists' skepticism toward nuclear energy affects the manner in which they perceive and report the news about nuclear energy to the public at large. Further, the American public has probably been influenced in its perceptions by the manner in which the risks of new technologies have been dealt with in the media.5/

Why have liberals and those on the left in this country been so critical of new technologies such as nuclear energy compared to leadership groups in France, where the left, for the most part, supports nuclear energy.? The concluding section of our essay offers a brief speculative answer to this question.

III. The Perception of Risk as a Surrogate for Ideology

What follows is an attempt to understand some of the often unconscious sources of attitudes and attitude change. That some of the sources of an individuals' perceptions are non rational does not mean they are incorrect. The perceptions of all of us, liberals and conservatives alike, are influenced by nonrational factors.

We hypothesize that nuclear energy is a surrogate issue for more fundamental criticisms of American institutions. To establish this hypothesis, it is necessary to briefly compare American and European political development and to examine the history and dynamics of the

environmental movement in this country, especially as it relates to nuclear energy.

Few commentators would deny that, for most of its history, public political discourse in the United States (as against Europe) has been dominated by the "liberal capitalist" ideology which defined its founding as a nation. So pervasive has this ideology been that opposition to it could barely be conceived (Hartz, 1955; Lipset, 1977, 1983). America has lacked a genuine conservative tradition, supporting throne and altar, and longing to retain elements of a traditional feudal past. Nor has it ever developed a socialist tradition of any size. Liberalism has been so pervasive that even its sharpest critics have been largely unable to articulate a coherent alternative to it even for themselves. As elsewhere American liberalism the 19th and first part of the 20th century was closely tied to the idea of progress, especially material progress. (Nisbet, 1982)

As late as the 1950s, the professional and intellectual communities in the United States strongly supported both technology and economic growth, as well as the economic and political system.

The opponents of science and technology--those most suspicious of change--tended to be on the small town, fundamentalist, populist political right. In general the environmental movement during this period was still primarily concerned with the preservation of unspoiled wilderness areas or creation of national parks, a concern which had always differentiated it from its European counterparts. Leaders of such major groups as the Sierra Club were largely people who loved the wilderness and were active sportsmen and women (Dubos, 1980; Nash, 1982;

Faich and Gale, 1971).

This all changed in the 1960s, although the change had been in the making for some time (Bell, 1976; Rothman, 1979; Rothman and Lichter, 1982b, Rothman, 1984). The growth of industrialism and affluence gradually produced a new middle class of professionals removed from the society's central economic institutions and new cadres of intellectuals critical of underlying American values. Just as important, traditional religious beliefs, and institutions which had served as the underpinning of the socio-economic system were eroding. With that erosion some deeper levels of emotional support for the system were being undermined. In short, key segments of the new middle class were gradually becoming alienated from major institutions and key cultural norms.

The events of the 1960s brought their alienation to a head. The war in Vietnam and the race issue enabled the "new left," a largely upper middle class movement, to mobilize a much larger number of initially less alienated Americans for particular purposes (Rothman and Lichter, 1982a).

The ability of the more radical "new class" intellectuals to attract a broader constituency was increased by the explosion of college populations, and the television-sparked communications revolution that began in the 1950s. As late as the 1930s, "progressive" ideas developed by the creators and dispensers of culture in New York, San Francisco, Los Angeles and Chicago produced only faint echoes in small town America or in the ethnic ghettos of the major cities. By the 1960s such ideas were being routinely taught at colleges and universities, and transmitted nationwide almost instantaneously. Their format was more persuasive, and, given the decline of traditional institutions, their effect was much greater (Rothman, 1978, 1979a). Most elite journalists and academics were

not fully supportive of the new left, but a significant number of them resonated with at least some of its ideas (Ladd and Lipset, 1975; Rothman and Lichter, 1982a).

In the early 1970s, the winding down of the Vietnam War and the increasing complexity of the race issue led to a diminution of overt radicalism. Once again, those who wanted to change American society in fundamental ways found themselves leaders without troops. Nevertheless significant numbers of middle class professionals remained highly critical of the system, and traditional values commanded less support from other segments of the population (Rothman and Lichter, 1982a).

During the 1960s a new awareness of the possibly dangerous ecological and health side effects of technological change also began to emerge. Most commentators date this awareness from the appearance of Rachel Carson's Silent Spring (1962), although the book did not begin to receive significant attention until later in the decade.

The environmental issue was among several on which those hostile to the dominant values of the society could focus. The problems were real, and they could be used to mobilize a much larger number of individuals looking for a meaningful cause to express their hostility to "corporate capitalism."

It was just this group, urban, sophisticated and cosmopolitan, which sparked changes in the character of the environmental movement and came to control the older "public interest" groups, even as they created new groups (Faich and Gale, 1971; Webber, 1982; Dunlap and Olsen, 1984) Scaminaci III, and Dunlap, 1986). Public interest group leaders were the most liberal or left of all the leadership groups we studied. For

example, 51 percent believe that the United States should move toward socialism, and 34 percent approve of Fidel Castro, compared to only five percent who approve of Ronald Reagan (Lichter, Lichter and Rothman, 1983b).

Joining them were a small group of highly articulate adversary scientists who are generally on the left and share their hostility to business. To them the real dangers to the environment and health posed by nuclear energy result from the operation of industrial capitalism itself. They have enthusiastically entered the public arena to combat this evil.

Barry Commoner, a "public" and "adversary" scientist stated their perspective forcefully at an antinuclear rally in 1979:

> Who owns the air? Who owns the water? Who owns the earth?...You know the right answer--we do, the people of the United States. But who controls our resources? The electric utilities, the oil companies--they decide whether we get radiation with our power. They decide whether we get carcinogens in our food. Who owns America? For whose benefit is this country run? For people or for profits?...We stand for...the public control of oil companies, for running this country in the interest of the citizens, not in the interest of profits. (Wolfe, p. 243)

Other activist adversary scientists such as George Wald or Richard Levontin have not been much less reticent about their alienation from American political and social institutions (Rothman and Lichter, 1982a, pp. 430-431).

These beliefs are sincerely held. Those who adhere to them are not engaged in fighting nuclear energy because of a Machiavellian desire to

mobilize the population for secret purposes. Nevertheless, our evidence suggests that some who argue evidence that Americans are being exposed to large scale dangers from nuclear energy are partly seeking surrogates for a more direct attack on the dominant values of American liberal capitalism. In France, by contrast, the political left does not require surrogate issues. It can still mount a direct attack upon the existing social and political order.6/

Liberals and radicals are not the only ones who treat certain social issues as surrogates for a much broader sense of alienation. The political right, for example, has repeatedly attached great symbolic value to such issues as internal Communist subversion or the need for prayer in the schools. These issues serve as focal points for attempts to deal with the complex and confusing changes taking place in American society. Political moderates also engage in such symbolic politics.

The articulateness and mobility of the middle class activists who created the new environmental movement gave them distinct advantages. They could easily gain the attention of the media because of their communication skills, and because leading figures in the news and entertainment media sympathize with many their views. The activists and media leaders are very similar in background and orientation (Lichter and Rothman, 1981; Lichter, Lichter and Rothman, 1983 a,b; Rothman and Lichter, 1982b, 1984).7/

In France decisions on nuclear energy have remained largely technical in nature and are, by and large, dealt with rather quietly by technicians, although decisions on issues of nuclear safety are widely publicized. In

England, the ties which bind together the scientific establishment, journalists, and political actors remain largely intact, though there has been some erosion in both countries. In the United States the situation has changed quite drastically (Wade, 1980; Gillespie and Johnston, 1982:).

Drawing upon slogans of democratic participation, American activists and "public interest" groups began to participate in political and public forums about risk, especially nuclear risk. Their participation has been encouraged by legislation, administrative policy and court decisions which sometimes even mandate the participation of the "public" in decisions about technical issues (Nelkin and Fallows, 1978).

Thus forums, debates, media reporting and even television programs and motion pictures have gradually created a public image of a dangerously polluted America, a potential cancer plague, and a threatening nuclear energy establishment at a time when, for a variety of other reasons, public trust in various traditional leadership groups has already eroded (Lipset and Schneider, 1983).

Today a substantial segment of the academic social science community is convinced that critics of contemporary technology are more correct than the scientific establishment (Lipset, 1982). Large numbers of citizens are also willing to believe that the various ills which beset them may result from the activities of industry or government. They have also begun to demand protection and compensation. Such ideas have become so deeply embedded that they will change only quite slowly, if at all.

It is clear that the irrationality of the regulatory process in the United States has been partly responsible for cost overruns and has, in some cases, probably reduced rather than enhanced the safety of nuclear energy. In France, which copied American technology, the cost of nuclear

energy is significantly lower and the safety record significantly better than in the United States. In this country the hypertrophy of complex regulations has both reduced morale and encouraged "going by the book," to meet regulatory requirements rather than rationally relating means to ends. (Wade, 1980, Barkenbus, 1986, New York Times, July 17,1986, p.B5).

The problems which nuclear energy has faced in the United States can not, however, be laid entirely at the doorstep of the media, activist groups, or bureaucratic regulation. In France the nuclear energy industry is highly standardized. All plants closely resemble each other. Thus regulators can build on common experience, and the approval of new plants is a relatively simple process.

In the United States, on the other hand, nuclear plants are built by architect engineering firms under contract to individual utilities. While most plants share a family resemblance, many differ slightly from their predecessors and necessarily require a full set of new hearings and evaluations. Further, while a number of larger utilities developed experience and increased competence over time, many smaller utilities built no more than one plant, and information about the kinds of problems that might be faced was not widely disseminated until quite recently. Managers often viewed nuclear facilities as little different from facilities that relied on coal or oil. Moreover, utilities did overestimate the rise in the demand for electricity.

Further, for many years both the Atomic Energy Commission and the nuclear industry refused to even consider legitimate safety concerns, and did conceal from the public (and themselves) some of the real dangers posed by nuclear technology. They also made grandiose claims about its potential

advantages ("electricity too cheap to meter") and its absolute safety. They maintained that a major accident was all but impossible and scorned anyone who was even slightly skeptical. At least some of the hostility engendered by the industry among a segment of the scientific community must be seen as the result of AEC and industry unwillingness to consider reasonable suggestions for enhancing safety (Del Sesto, 1979). Yet the effects would be relatively minor in the absence of the factors considered above.

Conclusions

The argument undergirding this essay is that the new environmental movement in the United States is partly a symbolic issue. Some liberal or radical members of key strategic elites (especially the news and entertainment media, and public interest groups) who are alienated from the social and political system, but live in an environment in which they cannot directly criticize the hegemony of liberal capitalism, are drawn to concrete issues which serve as a surrogate for such a critique.

The process of substituting such issues for a broader critique of the society is not necessarily a conscious one, and the issues chosen are often genuine, i.e., problems with which the society must cope. They must be issues which can appeal to a larger non-ideological constituency if the appeal is to be successful in arousing public support.

To test our argument we chose the question of nuclear energy. It is impossible to test a broad gauged argument of this kind directly. One can, at best, infer from it which are subject to empirical falsification. We made five predictions.

1) The relevant scientific community would be highly supportive of nuclear energy.

2) Views about nuclear energy would correlate highly with political ideology among various non scientific leadership groups.

3) National media journalists would be skeptical of nuclear energy.

4) Journalists would inaccurately perceive and report the views of the relevant scientific community on nuclear issues to other elites and to the general public.

4) The views of key leadership groups would correlate highly with the news sources which they perceive as reliable.

All these hypotheses were confirmed by the evidence.

Drawing upon standard historical materials, we then briefly outlined the historical analysis which underlies our view of the reasons for the fall from grace of the nuclear power option in the United States.

We conclude that the fears of Americans about new technologies, and nuclear energy in particular, have emerged because of real problems which deserve careful discussion, thought and decisions. However, the exaggerated concerns about possible risk which that significant segments of the population are to related conflict among various leadership groups, a weakening of the social fabric of the society, a social mistrust that dates from the early 1960s, and a shift of the locus in influence and power in our society.

Footnotes

1/ Slovic offers several additional hypotheses which we regard as more plausible, but we shall not discuss them here. Other commentators have suggested that natural disasters are generally considered to be acts of nature, and, thus, foster a general resignation. However, such an argument would not necessarily apply to bursting dams. We suspect that fears of radiation, regarded as an invisible danger which only manifests itself after a long period of time, plays a key role in the public's unique concern about nuclear energy.

2/ Lipset and Schneider (1983) document the sharp decline of public confidence in business during the past twenty years. Interestingly enough, the decline is primarily in public perceptions of business activity in the abstract. The public is still positive about business when they describe actual contacts with business firms. As Walter Lippmann pointed out (1922) the influence of the media on public opinion is greatest in those areas in which the public receives no immediate, easily checked feedback in their personal experience.

3/ We used a more complex measure of ideology for our non-scientific elite groups than for our science sample. However, for these groups, self described political beliefs correlated at .50 with the alienation factor and at .66 with the liberalism factor.

4/ Our survey e asked scientists to list any public interest groups with which they were affiliated. Only one from the random sample mentioned the UCS. Extrapolating from that sample, we estimate that fewer than 200 scientists of the 130,000 listed in American Men and Women of Science were affiliated with the UCS at that time.

5/ Some critics also argue that Americans have changed psychologically. Whereas economic growth was once their most important concern, they are now in the process of choosing new values, so called "post-industrial" or "expressive" values and are less concerned with growth than with the quality of life itself (Wachtel, 1983).Drawing upon the work of Ronald Inglehart (1977), the Office of Technology Assessment's (OTA) report on Nuclear Energy picked up these themes in discussing the reasons for the decline of support for nuclear power in the United States (Office of Technology Assessment, 1984, pp. 227-230).

Inglehart and his colleagues have administered a questionnaire designed to measure such values to a number of leadership groups in Europe and America. Respondents were asked to choose from a list of options which they considered most and least important as goals for their society. The goals included such items as "maintaining a strong defense," and "encouraging economic growth" as examples of "instrumental" or "bourgeois," choices, and "increasing community participation," or "creating a society in which ideas rather than money are most significant," as examples of "expressive" or "post industrial" values. They have discovered, not surprisingly, that student activists are much more likely than businessmen to list "expressive" values as most important to them. Some scholars have found that anti-nuclear activists score higher on post-bourgeois values than do control groups (Inglehart, 1981; Ladd, Hood and Van Liere, 1983).

Our own analysis does not support such findings. We administered Inglehart's (1977) questions to our leadership sample with results very similar to his. Entertainment elites and public interest group leaders choose post industrial values by margins on the order of two to one,

while the military reverse that ordering. However, when these variables are added to the regression equation in place of the ideology variables, only 2.4% is added to the variance explained. While this addition is significant, it is much smaller than the increase caused by the ideology variables. Indeed, when ideological variables are included in the equation, the significance of instrumental and expressive values disappears. Thus while the expressive or post bourgeois attitudes factor may play a role among some activist groups which have been sampled, they do not seam to be of major significance among key leadership groups in the society.

6/ Nelkin and Pollak (1983) argue that the inability of the French anti-nuclear movement to get off the ground has been primarily a function of the centralized bureaucratic nature of decision making in France. There is some truth to this, but institutional structures do not explain why the French Communist Party is strongly supportive of nuclear energy, and the French Socialist Party at least moderately so.

Originally most large European Communist parties and most large (or governing) European Socialist Parties supported the rapid development of nuclear energy, while small Communist Parties (such as the Swedish Communist party) opposed it. The rise of the environmental movement and the establishment of such groups as the "Greens" in Germany has changed the picture.

As traditional political categories erode in the second half of the 20th century, those alienated from the system seek new ones. Nuclear energy is a natural issue given widespread public anxiety about nuclear weapons. France remains an exception at least in part because of

the success of its nuclear program.

Like the student movement in the 1960's, the environmental movement, in its current form, was initiated in America and brought to Europe via the American media. Anti-nuclear activism in Europe took off only in the middle 1970's. Indeed Americans contributed directly to such activism. Petra Kelly, a key founding figure of the Greens, is the daughter of an American father and a German mother and was raised in the United States (Shell, 1973; Nelkin and Pollak, 1981).

7/ Of course, our hypothesis could be reversed. The left has argued that businessmen (and conservatives in general) seek technological answers to social problems. Thus, they support nuclear energy in the hope that economic growth will solve what are essentially systemic problems. Even if radical critics are correct, however, this would not mean that conservatives support nuclear energy as a surrogate issue. After all, American conservatives assert quite explicitly that they support nuclear energy because they consider economic growth essential. Traditionally the left has shared this view. At late as 1962 the Port Huron Statement of Students for a Democratic Society (SDS) argued that nuclear energy would bring about sufficient affluence to power the transition to socialism.

One should not seek non rational "symbolic" explanations for beliefs unless rational-instrumental explanations do not suffice. Our findings indicate that conservatives' perceptions of scientists' views of nuclear energy are considerably more accurate than are those of liberals. This suggests that their views on <u>this</u> issue are less distorted by ideological perspectives than are those of the left.

TABLES

TABLE 1

ARE NUCLEAR PLANTS SAFE
(Percent Answering Yes)

	%	N
All Groups	36.8	1203
Bureaucrats	52.0	199
Congressional Aides	39.1	132
Lawyers	48.6	149
Media	36.5	156
Journalists		
NY Times & Wash.Post	29.4	51
TV	30.6	49
Military	86.0	152
Movies	14.3	90
Public Interest	6.4	154
TV - Hollywood	12.5	103
SCIENTISTS		
All	60.2	925
Energy Experts	75.8	279
Nuclear Energy Experts	98.7	72

TABLE 2. EQUATIONS PREDICTING NUCLEAR SAFETY ATTITUDES AMONG ENERGY EXPERTS

	1	2
Ideology		-.28**
# Democratic votes	-.15+	.01
Background:		
South	.07	.05
West	-.04	-.03
Midwest	.06	.06
Foreign	-.01	.03
Protestant	.03	.001
Catholic	-.07	.06
Jewish	.05	-.10
None	-.10	-.07
Age	.01	-.01
Female	.09	-.09
Employment Group:		
Government	.08	.10
Business	.14	.12
Academic Consultant	.10	.09
R-squared	.07	.12*

Note: + = p<.05, * =p<.01, ** = p<.001

SUMMARY EFFECTS OF PREDICTOR VARIABLES

VARIABLES: Step 1	Step 2	Column	R-Squared	Stepwise change in R	F ratio of change
Background		1	.07	----	1.40**
Background	Ideology	2	.12	.04	2.21**

Note: Column statistics are beta-weights. Ideology, democratic votes,and age are continuous variables; all others are dummy variables.

TABLE 3. EQUATIONS PREDICTING NUCLEAR SAFETY ATTITUDES AMONG LEADERSHIP GROUPS

	1	2	3	4	5	6
Alienation	-.46**	-.23**		-.16**		-.15**
Liberalism	-.24**	-.42**		-.35**		-.34**
Background:						
South		.005	.04			-.001
West		-.01	-.01			.03
Midwest		.04	.07+			.04
Foreign		.01	.02			.03
Protestant		.07	.31**			-.02
Catholic		.06	.24*			-.02
Jewish		.02	-.003			.002
None		.04	.05			-.0001
Age		.04	.11**			.05
Female		-.06+	-.18**			-.06+
Leadership Group:						
Bureaucrat				.09*	.11*	.05
Lawyer				.07+	.10*	.04
Television				-.11**	-.18**	-.15**
News Media				.04	-.01	.02
Movies				-.11**	-.18**	-.15**
Public Interest				-.12**	-.34**	-.13**
Military				.19**	.32**	.16**
R-squared	.41**	.42**	.17**	.48**	.35**	.49**

Note: + = p<.05, * =p<.01, ** = p<.001

SUMMARY EFFECTS OF PREDICTOR VARIABLES

VARIABLES:

Step 1	Step 2	Column	R-Squared	Stepwise change in R	F ratio of change
Ideology		1	.41	----	371.53**
Ideology	Background	2	.42	.01	1.80
Background		3	.17	----	22.00**
Background	Ideology	2	.42	.25	226.22**
Ideology	Group	4	.48	.07	19.32**
Group		5	.35	----	81.41**
Group	Ideology	4	.48	.13	129.66**
Group + Background	Ideology	6	.49	.09	89.21**

Note: Column statistics are beta-weights. Liberalism, Alienation, and Age are continuous variables; all others are dummy variables.

TABLE 4A

SCIENTISTS SHOULD RESTRICT PUBLIC STATEMENTS ON SCIENCE POLICY MATTERS TO AREAS OF EXPERTISE

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly	N
All Scientists	23%	22%	30%	25%	907
Very Pro-Nuclear	21%	21%	29%	29%	199
Very Anti-Nuclear	50%	25%	17%	8%	24

Chi square test, significance $< .01$.

TABLE 4B

RESEARCH FINDINGS SHOULD BE ACCEPTED BY PROFESSIONAL JOURNALS BEFORE THEY ARE REPORTED IN THE POPULAR PRESS

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly	N
All Scientists	7%	12%	33%	47%	908
Very Pro-Nuclear	6%	13%	33%	48%	200
Very Anti-Nuclear	33%	17%	33%	17%	24

Chi square test, significance $< .01$

TABLE 5A

NUMBER OF ARTICLES PUBLISHED IN
ACADEMIC OR PROFESSIONAL JOURNALS

	None	One to Ten	Eleven or More	N
All Scientists	11%	29%	61%	900
Very Pro-Nuclear	11%	30%	59%	201
Very Anti-Nuclear	18%	41%	41%	22

Chi square test, significance > .05.

TABLE 5B

NUMBER OF SCIENCE POLICY ARTICLES
IN NON-PROFESSIONAL JOURNALS

	None	One or More	N
All Scientists	89%	11%	832
Very Pro-Nuclear	87%	13%	183
Very Anti-Nuclear	64%	36%	22

Chi square test, significance >> .01.

TABLE 6

SUPPORT FOR NUCLEAR ENERGY AMONG
SCIENTISTS AND LEADING JOURNALISTS

	Score on Nuclear Support Scale	N
Nuclear Experts	7.86	72
Energy Experts	5.10	279
All Scientists	3.34	741
Science Journalists	1.30	42
Prestige Press Journalists	1.16	150
Science Journalists at New York Times, Washington Post, TV Networks	.47	15
TV Reporters and Producers	-1.89	18
Public Television Journalists	-3.25	24